REMARKS

Claims 1-20 are pending in this application, claims 7-12, 14, 15 and 20 having been withdrawn as being directed to a non-elected species. Of these claims, claims 18 and 19 stand rejected under 35 USC §102(b) as being anticipated by Mitani et al.; claims 1, 2, 4-6, 13, 16 and 17 stand rejected under 35 USC §103(a) as being unpatentable over Aramaki in view of Mitani et al.; and claim 3 stands rejected under 35 USC §103(a) as being unpatentable over Aramaki in view of Mitani et al. and Stenersen et al. Also, claim 18 stands rejected under 35 USC §112, second paragraph, as being indefinite for a missing word.

In view of the preceding amendments and the following remarks, these rejections are traversed, and reconsideration of this application is respectfully requested.

By the above amendment, independent claim 18 has been amended to state that the compressor is driven at a desirable speed. It is therefore respectfully requested that the §112, second paragraph, rejection be withdrawn.

Applicant's invention is a system and method for preventing compressor surge in a fuel cell system. The system and method stores a compressor map of the operation of the compressor, and uses the speed of the compressor to determine where on the compressor map the compressor is operating to prevent the compressor from entering a surge condition.

Japanese Patent Publication 60-160574 to Mitani et al. discloses a turbo-compressor system for fuel cell power generation. The system includes a turbine 14 that drives a compressor 12, where the compressor 12 provides an airflow on air feed line 15 to a fuel cell 1. Figure 1 in Mitani shows a compressor map similar to

the compressor map shown in figure 1 of Applicant's specification. The compressor map includes a surge line I that separates the map into a surge portion A on the left side of the line I where the compressor 12 is in a surge condition, and a non-surge portion B on the right side of the line I where the compressor 12 is not in a surge condition. A by-pass line 17 is provided in the feed line 15. Compressor air flows through the by-pass line 17 when a flow rate regulating valve 18 is opened in response to a compressor surge condition to make the turbine 14 rotate or operate faster, which in turn increases the speed of the compressor 12 to eliminate the surge condition.

Applicant respectfully submits that their system and method for preventing compressor surge in a fuel cell system is different than what is fairly taught or suggested by Mitani et al. Applicant's claimed system and method stores the compressor map in an electric format in the system, and uses the speed of the compressor to determine where on the compressor map the compressor is operating so that the controller can prevent the compressor from entering the surge condition prior to it happening.

The relationship of discharge pressure and mass airflow for a compressor shown in figure 1 in Applicant's specification and figure 1 in Mitani et al. is a relationship that is well known and understood to those skilled in the art. Applicant submits that Mitani et al. is using this relationship in their figure 1 to show when the compressor 12 is in a surge condition and when it is not. Applicant submits that Mitani et al. does not store the compressor map that they show in their figure 1 to be used in the system because there is no need for the map to be stored in that system. Figure 1 in Mitani is merely for edification purposes. Applicant submits that nothing in Mitani et al. would teach or suggest to one of ordinary skill in the art that the Mitani

et al. system uses any type of input signal, such as airflow rate, compressor speed, discharge pressure, etc., to determine the location on a compressor map that the compressor is currently operating on. The figures in Mitani et al. do not show any device that would provide such a signal.

What the Mitani et al. system does do is detect that the compressor 12 is already in a compressor surge, and then take action by opening the regulating valve 18 to remove the compressor surge. In Applicant's claimed invention, the compressor speed is monitored so that as the operating parameters of the compressor approach the surge line in the stored compressor map, suitable action can be taken before the compressor enters the surge condition to prevent compressor surge.

In order to more particularly define this feature of Applicant's invention, independent claims 13 and 18 have been amended above to state that the controller uses the stored compressor map and the speed of the compressor to determine the location on the compressor map where the compressor is operating to prevent the compressor from entering a surge condition. Therefore, Applicant respectfully submits that Mitani et al. does not anticipate independent claim 18, especially as amended.

U.S. Patent Publication 2002/0039672 to Aramaki discloses a fuel cell system that includes an airflow meter 4 provided downstream from a compressor 2 in a cathode input line and a back-pressure valve 14 in a cathode output line. Applicant recognizes that it is known in the art to employ an airflow meter and a back-pressure valve in the cathode side of the fuel cell system. However, Aramaki does not make any mention of preventing compressor surge of the compressor 2, and clearly does not use an airflow signal from the airflow meter 4 to determine the

discharge pressure of the fuel cell and where on the compressor map the compressor is currently operating. Therefore, Applicant respectfully submits that even if the teachings of Mitani et al. and Aramaki were combined, there is no teaching in either of these references that an airflow signal from an airflow meter can be used to determine where on an electronic compressor map stored in the system that the compressor is operating on. It is therefore respectfully requested that the combination of Aramaki and Mitani et al. does not make independent claims 1 and 13 obvious.

It is believed the Examiner is using United States Patent Application Publication 2002/0150805 to Stenersen et al. to teach centrifugal, radial, axial and mixed flow compressors in a fuel cell system. Applicant submits that Stenersen et al. fails to provide the teaching missing from Aramaki and Mitani et al. to make Applicant's claimed invention of independent claims 1 and 13 obvious.

In view of the preceding amendments and remarks, it is respectfully requested that the §102(b) and §103(a) rejections be withdrawn.

It is now believed that this application is in condition for allowance. If the Examiner believes that personal contact with Applicant's representative would expedite prosecution of this application, he is invited to call the undersigned at his convenience.

Respectfully submitted,

MILLER IP GROUP, PLC
Attorney for Applicant

By: John A. Miller
John A. Miller
Reg. No. 34985

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42690 Woodward Ave., Ste. 200
Bloomfield Hills, MI 48304
Telephone: (248) 858-4200
Facsimile: (248) 858-4201